



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,163	10/11/2001	Daniel Xu	INTO-0008-US(P12501)	9107

7590 11/12/2003
Timothy N. Trop
TROP, PRUNER, HU, P.C.
8554 KATY FWY, STE 100
HOUSTON, TX 77024-1805

EXAMINER

KEBEDF, BROOK

ART UNIT	PAPER NUMBER
----------	--------------

2823

DATE MAILED: 11/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 09/975,163	Applicant(s) XU, DANIEL	
	Examiner Brook Kebede	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-946) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Claims 1-12 in the response filed on August 1, 2003 is acknowledged. Accordingly, the non-elected claims, i.e., claims 13-35, have been cancelled by the Applicant.
2. Currently, Claims 1-12 are pending in the application.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the **"forming a pair of tapered electrodes for a pair of adjacent phase-change memory cells, covering the electrodes with an insulator and forming a trench between the covered tapered electrodes as a mask,"** as recited in claim 3, **"forming junctions below said tapered electrode,"** as recited in claim 6 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

Claim 6 recites the limitation "The method of Claim 1 including forming junctions below said tapered electrode" in lines 1-2. However, the limitation "forming junctions below said tapered electrode" does not have support in the specification. Appropriate correction is required.

Claim Objections

5. Claims 3 and 6 objected to because of the following informalities:

Claim 3 recites the limitation “covering the electrodes with an insulator and forming a trench between the covered tapered electrodes as a mask” in lines 3-5. However, the recited claim lacks clarity. As suggestion, change “covering the electrodes with an insulator and forming a trench between the covered tapered electrodes as a mask” to -- covering the electrodes with an insulator and forming a trench between the covered tapered electrodes **using the covered tapered electrodes** as a mask--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 8 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 8 recites the limitation “The method of claim 7 including forming said layers by ion implantation” in lines 1-2. The specification does not provide any enabling disclosure how one of ordinary skill in the art can form a layer by ion implantation. As well-known in the art, ion implantation is usually performed to implant a previously formed layer in order to change conductivity of that layer or to form active diffusion region in the layer. However, it is not known that ion implantation can form a layer. Therefore, the claim contains subject matter which

was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation “A method comprising: forming a tapered electrode for a phase-change memory cell; and forming a trench using the tapered electrode as a mask” in lines 1-4. However, the recited claim lacks clarity in its meaning and scope for the following reason:

It is not clear how and where the trench is formed as recited in claim 1. As result the claim lacks clarity in its meaning and scope. Therefore, the claim is indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2-12 are also rejected as being dependent of the rejected independent base claim.

Applicant's cooperation is requested in reviewing the claims structure to ensure proper claim construction and to correct any subsequently discovered instances of claim language noncompliance. See *Morton International Inc.*, 28USPQ2d 1190, 1195 (CAFC, 1993).

In light of the rejection 35 U.S.C. § 112 second Paragraph that set forth herein above, the following 35 U.S.C. 102 rejection is based on prior art which reads on the interpretation the claim language of the instant application as best as understood by the Examiner.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Pryor et al. (US/4,845,533).

Re claims 1-12, Pryor et al. disclose a method comprising: forming a tapered electrode (38 40 42) for a phase-change memory cell; and forming a trench using the tapered electrode as a mask (see Figs. 1-3) including covering said tapered electrode with an insulator (70); including forming a pair of tapered electrodes for a pair of adjacent phase-change memory cells, covering the electrodes with an insulator and forming a trench between the covered tapered electrodes as a mask; including self-aligning the trench to the tapered electrode; including forming a tapered electrode by isotropically etching; including forming junctions below said tapered electrode; including forming a plurality of layers of different doping levels; including forming said layers by ion implantation; including etching said layers using the same isotropic etch used to form said tapered electrode; including forming a tapered substrate portion below said tapered electrode; including forming a conical-shaped substrate portion covered by said tapered electrode; including covering said tapered substrate portion with an insulator and anisotropic etching said covered tapered substrate portion (see Figs. 1-3; Col. 5, line 40 – Col. 13, line 24).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Rideout (US/4,058,498), Adlerstein (US/4,474,623), Holmberg et al. (US/4,599,705), Kobayashi (US/6,014,400), Doan et al. (US/6,150,253), and Kimura et al. (US/6,407,004) also disclose similar inventive subject matter.

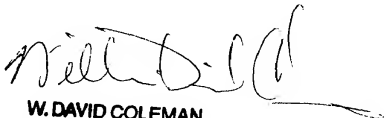
Correspondence

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede
bx
November 1, 2003


W. DAVID COLEMAN
PRIMARY EXAMINER